

**U.S. DEPARTMENT OF ENERGY**  
**OFFICE OF NUCLEAR ENERGY SCIENCE AND TECHNOLOGY**

**INNOVATIONS IN NUCLEAR INFRASTRUCTURE AND EDUCATION**

**RESEARCH AND EDUCATION GRANTS**

**Innovations in Nuclear Infrastructure and Education**

## **Program Overview**

### **Objective**

The objective of the Innovations in Nuclear Infrastructure and Education (INIE) program is to strengthen the Nation's university nuclear engineering education programs through innovative use of the university research and training reactors and encouraging strategic partnerships between the universities, the DOE national laboratories, and U.S. industry.

### **Background**

In 1975 there were 47 universities offering degrees in nuclear engineering, in 2001 there were only 24 similar programs with at least a half-dozen additional programs being threatened for closure. In 1979, there were approximately 1,800 students enrolled in B.S. degree programs; 900 in M.S. programs; and 600 in Ph.D. nuclear engineering programs. In 1999, there were 550 B.S. degree students, 250 M.S. degree students and 190 Ph.D. students. In short, there has been a dramatic and an alarming decline of the educational infrastructure relative to nuclear engineering in the United States over the past twenty years. This has come at a time when the demand for nuclear engineers triples the supply at all degree levels and current projections are for the demands to quadruple supply by 2004.

Corresponding to this trend, in 1979 there were 63 research reactors located at universities throughout the United States. In 2001, there were 27. As noted in a June 2001 report by a Nuclear Energy Research Advisory Committee (NERAC) Task Force on University Reactors, university research and training reactors are underutilized and, as a result, are being decommissioned. According to the task force, the reason for the lack of utilization is a chronic inability to generate sufficient funds to procure and maintain state of the art instrumentation and technical staff support for prospective users.

University research reactors are the focus of research in support of nuclear science and technology. They also support multi-disciplinary research with important contributions to physics, chemistry, biology medicine, epidemiology, environmental science, material science, fluid mechanics, geology, archeology, paleontology, forensic science, human factors, and many other fields.

As a result of the findings of the NERAC task force, the Innovations in Nuclear Infrastructure and Education (INIE) program is being established to provide qualified universities and reactor facilities serving the university community with funds to improve the instrumentation and equipment used at the facility; maintain highly qualified research reactor staff; establish programs that fully integrate the use of university research reactors with nuclear engineering education programs; and establish internal and external user programs. The INIE program encourages universities to actively seek and establish enhanced collaboration with other colleges and universities, DOE national laboratories, U.S. industry, and other private and/or public organizations. Through the INIE program,

the Nation's university nuclear engineering education programs will prosper, the university research and training reactors will remain operational, and the next generation of nuclear scientists and engineers will be available to support the Nation's future energy security and national security needs.

### **Funding Eligibility**

Eligibility for INIE grants is restricted to U.S. colleges and universities with nuclear reactor facilities or state-operated reactors not operated by a university but used by the university community in support of the Nation's nuclear science and engineering research programs. The INIE program encourages associations among university research and training reactors to create integrated programs. Recipients of an INIE award will remain eligible for funding in the Department's Reactor Sharing and Reactor Upgrade programs. (However, priority in these two areas will be given to non-INIE participants). An independent peer-review panel will recommend to DOE the amount of individual awards.

While the Department of Energy has placed no limit on the dollar amount of the INIE awards, the typical award is expected to range between \$100,000 - \$2,000,000 per year. The awards are also expected to be renewable on an annual basis for up to four additional years. The Department will make the final determination regarding the amounts of the INIE awards based on the availability of annual appropriations and the university community's response to the INIE solicitation.

### **Evaluation of Applicants**

Applications for INIE awards will be merit-based and peer-reviewed with recommendations for awards being made to the DOE Source Selection Official. Criteria for the review and evaluation of INIE awards will include: the uniqueness, innovation, and scope of the approach; new investments made in reactor and nuclear technology education programs by the applicant university(ies) that demonstrate a long-term commitment to nuclear technology education; strategic partnerships with other colleges and universities, DOE national laboratories, U.S. industry, and other private and public research organizations; core staff capabilities and qualifications; the cost-effectiveness of the plan; the university's commitment to the facility and the INIE program; and the overall balance of the program in terms of geographic location, research and training objectives; and size and type of universities included in the application.

Preference will be given to institutions that can clearly demonstrate an innovative and comprehensive plan to provide the highest quality university research, training, and education in nuclear science and technology.

In developing their applications to the INIE program, universities are expected to address the following questions:

- Has the applicant developed an innovative and unique research and/or training program? Is this innovative plan supportive of nuclear science and engineering research and/or training and does it contribute to the overall viability of the research and/or training reactor(s)?
- Has the applicant developed a clear and manageable plan that identifies both short and long-term goals and objectives? Do these objectives match with specific activities and is there a reasonable chance for success? Does it have an overall positive impact on nuclear science and engineering research, training and other related areas?
- Have specific research and/or training area(s) been identified? Are these area(s) significant in that they are important and have an impact on societal needs? Have potential users been identified?
- Does the plan relate to the capabilities of the reactor(s) and current staff and/or those the applicant plans to hire?
- Has a strategic partnership been established to augment the applicant's reactor and academic programs with other colleges and universities, DOE national laboratories, U.S. industry, and other comparable private and public research organizations?
- Does it appear that the reactor and ancillary facilities will be made readily available to potential users? Are target groups both external and internal to the university identified? Are participants from non-nuclear fields included? For each group of participants, is there a clearly defined process for offering the use of the facility for research and educational purposes? Does this plan relate to the capabilities of the reactor and its current staff and/or those the applicant plans to hire? Are sufficient numbers of potential users affected by the plan? Have steps been taken to ensure that diversity is a part of this identification and recruitment of program participants?
- Is the approach cost-effective? Does the budget appear to be reasonable and directly connected to the plan? In both the hiring of new personnel and in the procurement of new equipment does it appear that ample time has been allowed to accomplish these activities? Is there appropriate documentation, which indicates that this award would not subsidize commercial users?
- Is the university commitment to the INIE program significant and long-term?
- Over the past five years of operations, has the reactor been operated in a safe and responsible manner?
- What efforts are demonstrated by the applicant(s) to include minorities in the INIE proposal?

- Can the university certify that existing university funds for nuclear engineering (reactor , education, etc.), will not be reduced as a result of funds provided by the INIE program? Preferred applicants will be able to demonstrate this.

## **FINANCIAL ARRANGEMENTS**

### **Duration of Grants**

Funds for the INIE are provided through a financial assistance grant with the host institution. Awards will represent a grant of one year, renewable for four additional years. Renewals will be based on the previous year's performance.

### **Allowable Costs**

Allowable costs may include the following, however because of the emphasis on providing innovative and unique approaches to nuclear science and engineering education additional approved costs may also be reimbursed.

1. Travel and Lodging
2. Personnel
3. Student Scholarships, Fellowships, Internships
4. Mini-Grants and Subcontracts to Educational Institutions
5. Equipment
6. Service Contracts Related to Research, Education and Training Activities
7. Capital Outlays (above university baseline)

As emphasized earlier, this award is designed to enhance the facilities research, education and training programs. It is not designed to supplement existing program funds. Therefore, expenses should not be assigned to this grant for costs that are already incurred as part of the normal operating expenses of the facility. Indirect or other types of overhead charges are to be limited to 25% or lower of the total expenses.

## **REPORTS**

### **Annual Report**

An annual report summarizing program activities and financial expenditures supported under this award is required from the grantee. The details of this report should include specific information as it relates to the individual application. Descriptive details on program events and highlights should be provided. After the award is made DOE will provide the grantee with a specific format for this report.

### **Renewal Application**

All grants will be for a maximum of five years and they are renewable on an annual basis. This will require successful grantees to submit four renewal applications. These applications will be sent to the grantee three-months prior to conclusion of the previous year's grant. The renewal application will request information from the annual report, detailed information on the upcoming year and any information regarding revisions to the

original applications. Renewal applications will be reviewed and evaluated by an external peer-review panel and recommendations will be made to DOE regarding the continuation of the grant.

### **Application Preparation**

An application should include the following items. Attention must be given to the criteria and peer-review questions posed on page 4 of this solicitation.

1. A description of a five-year program plan including goals and objectives, timelines *etc.*
2. A description of the qualifications of existing staff and those to be hired.
3. An overview of the host university's involvement in the program.
4. A review of the program's participants, who they are and how they will be involved in the program.
5. Applications must include a completed Standard Form 424, "Application for Federal Assistance"; a DOE Form 4600.4 "Federal Assistance Budget Information"; DOE Form 1600.5 "Assurance of Compliance Nondiscrimination in Federally Assisted Programs"; and "Certifications Regarding Lobbying, Debarment, Suspensions and Other Responsibility Matters; and Drug-Free Workplace Requirements".

All application materials can be sent to any applicant electronically by contacting the following email address. [cardern@musc.edu](mailto:cardern@musc.edu) Questions regarding the application should be addressed to the following individual.

Craig Williamson  
[cwilliamson@msn.com](mailto:cwilliamson@msn.com)  
865 379-0403  
865 379-0496 fax

### **Submission of Applications and Deadline Date**

The original and five copies of the application should be submitted to:

Innovations in Nuclear Infrastructure and Education  
Special Programs Office  
Medical University of South Carolina  
165 Cannon St. #402D  
P.O. Box 250851  
Charleston S.C. 29425

Tel: (843) 792-1469 Fax: (843) 792-0235 email: [cardern@musc.edu](mailto:cardern@musc.edu)

The application should be signed on the cover sheet by the person officially responsible for the grant if it is awarded and by an authorizing university official.

**The deadline for receipt of applications is March 11, 2002.**

### **Review and Funding of Applications**

All applications submitted to this program will be reviewed and evaluated by a panel of experts in education, training and research reactor systems. This panel will provide the U.S. Department of Energy (DOE) with a set of recommendations regarding priorities based on the amount of funding available for this program. DOE is responsible for making the final determination on the approval of funds for all grants.